

Listing of Claims:

This listing will replace all prior versions and listings of claims in the application:

Claims 1-33 (Cancelled)

34.(Previously presented) Apparatus for ray tracing through a medium having multiple variations in refractive index including:

an image information acquirer providing information relating to local refractive index variations at any multiplicity of three dimensional locations in said medium, said local refractive index variations being determined by either one of differential interference contrast (DIC) imaging and phase microscopy; and

a computer employing an analytically determined path of a ray through the multiplicity of three dimensional locations in the medium, for a plurality of rays impinging thereon in different directions, by utilizing said determined local variations of the refractive index at said multiplicity of three dimensional locations in the medium.

35.(Previously presented) A method of ray tracing through a medium having multiple variations in refractive index including:

determining local variation of the refractive index at any multiplicity of three dimensional locations in the medium by either one of the methods of differential interference contrast (DIC) imaging and phase microscopy; and

analytically determining the path of a ray through the multiplicity of three dimensional locations in the medium, for a plurality of rays impinging thereon in different directions, by utilizing said determined local variations of the refractive index at said multiplicity of three dimensional locations in the medium.

Claims 36 - 37 (Cancelled)

38.(Previously presented) Apparatus according to claim 34, and wherein said ray tracer determines an aberrated wavefront for each of said plurality of rays originating

from each point in said medium; and also comprising an adaptive optics controller utilizing said aberrated wavefront to control an adaptive optical element in said microscope, thereby to correct aberrations resulting from the variations in the refractive index.

39. (Previously presented) A method according to claim 35, and also comprising the steps of:

determining an aberrated wavefront for each of said plurality of rays originating from each point in said medium; and

utilizing said aberrated wavefront to control an adaptive optical element in said microscope, thereby to correct said aberrations resulting from said local variation of the refractive index.

40. (Previously presented) A method for confocal microscopy comprising the steps of:

providing a confocal microscope having an image information acquirer providing information relating to variations in the refractive index in a three-dimensional imaged volume, said microscope having an imaging path between a three-dimensional sample and said image information acquirer; and

disposing in said imaging path a three-dimensional medium with refractive properties that correct aberrations resulting from said variations of the refractive index in the three-dimensional sample.

41. (Previously presented) Apparatus for confocal microscopy comprising:

an image information acquirer providing information relating to variations in the refractive index in a three-dimensional imaged volume, said apparatus having an imaging path between said three-dimensional imaged volume and said image information acquirer; and

a three-dimensional medium disposed in said imaging path; wherein said three-dimensional medium has refractive properties that correct aberrations resulting from variations of said refractive index in said three-dimensional imaged volume.